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As for the imagination, what is it but a faculty operating under laws as rigid as those of physics? As the distinguished ethnographer, Von Hellwald, remarks: "In spite of the endless multiplicity of forms, yet often one and the same or very nearly allied forms recur in localities widely asunder, and this seems to occur most frequently in forms which are peculiarly strange and artificial. We are almost forced to accept the discouraging suggestion of Peschel, that the human faculty of thought is a mere mechanism, which under a given stimulus is always forced to perform the same motion."

#### LETTERS TO THE EDITOR.

\* \* \* Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

The editor will be glad to publish any queries consonant with the character of the journal.

#### A Physiological Effect of Cave Visiting.

DR. HOVEY's interesting account of a visit to the Mammoth Cave in March, published in *Science* for April 7, 1893, recalled a recent conversation with my father, Dr. C. Fayette Taylor, on the subject of the cave, which he visited in July, 1860. He was particularly struck with, and vividly describes, the physiological effects experienced on emerging from the cave. He made the usual long trip with some fifteen companions, reaching upper air after a stay of about twelve hours under ground. On emerging the sense of smell was intensified to such an extraordinary degree, that most common objects, such as trees, plants, animals, and even people had strong individual odors, mostly unpleasant; about half the party were strongly nauseated and vomited. One tree could easily be distinguished from another by its characteristic odor. This effect lasted about half an hour and then passed off. The guides told him that this was a usual experience. Dr. Hovey alludes to this effect of a sojourn in the cave in a lecture published in the *Bulletin of the American Geographical Society*, March 31, 1891, in the following words: "By contrast with the pure oxygenated air of the cave, the odors of the outside world, of the trees, grass, weeds, and flowers, are strangely intensified and for many delicate natures overpowering." In a letter dated April 11, 1893, Dr. Hovey says: "I have always, or generally, been accustomed to rest at the entrance on emerging, for the reason that neglecting this precaution is apt to be followed by disagreeable consequences. I have known visitors to suffer from nausea and headaches by reason of a too sudden change from the peculiarly pure air of the cave to that of the outside world. The sense of smell is greatly intensified in almost every case."

I judge that this intensification of olfactory perceptions is due to the rarity of olfactory stimuli in the cave; on emergence, in accordance with a physiological law, the perceptive powers for these particular stimuli, having rested, are intensified, so that odors too delicate to make an impression under ordinary circumstances are powerfully felt. By the constant repetition of the ordinary olfactory stimuli this effect passes off, and soon only the stronger odors are registered in consciousness. In other words, consciousness is mainly concerned with the registration of the contrast between the stimulus of the moment and a background of fused and undifferentiated impressions. Ordinarily, sensations are increased by more intense stimulation, but they may also be increased, as in the illustration just given, by varying the background so as to bring ordinary stimuli into stronger relief. That a similar effect has been intensified by heredity is illustrated by Dr. Hovey's remarks on the auditory sensitiveness of the cave fauna. He says in the lecture already referred to: "The tiny [blind] fish are colorless, having cartilage instead of bones, are viviparous, and are so sensitive that if a grain of sand should fall on the water they would dart away with rapidity. Blind crawfish are also found here, whitish, semi-transparent, with remarkably long antennæ and more delicate in

every way than those found in outside streams. These also are highly sensitive and not easily captured."

This agrees with an observation of Professor Cope, quoted in the "Standard Natural History," Vol. III., p. 173. He says the Amblyopses, when swimming near the surface, as is their habit, are "easily taken by the hand or net, if perfect silence be preserved, for they are unconscious of the presence of an enemy, except through the sense of hearing. This sense is, however, evidently very acute, for, at any noise, they turn suddenly downward and hide beneath stones, etc., at the bottom."

HENRY LING TAYLOR, M.D.

New York.

#### Pre-Historic Remains in America.

IF Professor Thomas, in *Science*, May 5, had really desired to inform readers what my conclusion was in reference to the original home of the Mexican or Uto-Aztecan stock, he would have quoted, not various fragments from earlier studies, but the following from "The American Race," p. 121: "That very careful student, Mr. George Gibbs, from a review of all the indications, reached the conclusion that the whole group came originally from the east of the Rocky Mountain chain, and that the home of its ancestral horde was somewhere between these mountains and the Great Lakes. This is an opinion I have also reached from an independent study of the subject, and I believe it is as near as we can get to the birthplace of this important stock."

What I said of the Mayas was: "The uniform assertion of their legends is that the ancestors of the stock came from a more northern latitude, following down the shore of the Gulf of Mexico."

If Professor Thomas can controvert either of these propositions, I shall be glad to change my views to his.

As for his assertion that I "ought to know" that the shells and copper ornaments found in Tennessee and Georgia "are looked upon by all archaeologists as puzzling objects because of their remarkable departure from the types of the Atlantic slope," I certainly know nothing of the kind, nor does Professor Thomas. Only last summer that most competent archaeologist, Dr. E. Seler, published an article to show that these very objects are so little of a departure from historic Atlantic types that the theory of a relationship to Maya art is in his opinion unnecessary (see *Science*, Nov. 4, 1892).

If Professor Thomas had made himself acquainted with the current literature of American archaeology, he would not have risked such a statement.

D. G. BRINTON.

Philadelphia, May 8.

#### Tornadoes.

ABOUT five o'clock of the evening of April 24, a peculiar wavy appearance was noticed in the clouds, which were moving north. Every few minutes one or more miniature tornadoes would appear. The little funnels would last twenty or thirty seconds, others formed only to be destroyed shortly afterwards.

The whole time was about fifteen minutes, when the upper layers of clouds became more or less mingled with the lower layers. The barometer had been falling all day. The same evening there were two destructive tornadoes in Missouri and a heavy wind-storm at Paxton, Ind.

E. M. DANGLADE.

Vevay, Ind., April 29.

#### Pivotal Sounds in Recollection.

IN 1884 I published the statement that in the endeavor to recall some forgotten word or name that a remarkable tendency existed to substitute another word or name having, somewhere in its construction, a letter corresponding to one in the desired word or name. For example, Cavendish suggests itself, or rather may do so, when one is trying to recollect Van Antwerp, and so on; the V being the pivot upon which both names revolve, apparently, in the memory. In addition to this I find, at least in my own experience, an inclination to swing these memory efforts around the R sound more frequently than with other instances; for example,

for many years, and slightly to this day, I hesitate in naming Dearborn and Randolph Streets. Of course, any one living upon either of these streets would soon overcome such confusion through one name appearing oftener than the other in use.

The knowledge of this disposition has enabled me sometimes to recover the proper word by taking other words with the same "pivotal" letter, or sound, regardless of their sequence in spelling the word sought.

S. V. CLEVINGER.

Supt. Ill. East. Hospital for Insane.

#### Singing of Birds.

IN reply to a query by E. B. Titchener (*Science*, April 7) with regard to the expression of emotions in the singing of birds, I have a few notes. A song-sparrow, *Melospiza melodia*, with a broken leg past mending, was kept in our house in a cage about a year and a half, fed, bathed, otherwise cared for and occasionally allowed the freedom of a room. A happier, merrier fellow, I never saw. He sang early and late, nearly the year round, moped a few days and died. The taxidermist said he was much wasted in flesh, and had lived as long as he could. He was kept as comfortable as possible, and his song seemed purely an expression of happiness.

MARY B. MOODY.

Fair Haven Heights, New Haven, Conn., May 2.

#### Photographs of Botanists.

YOUR botanical subscribers and readers most likely will be interested in the collection of photographs of about 150 American botanists and a small number of foreign botanists, that Michigan State Agricultural College is displaying in the Departments of Liberal Arts at the Columbian Exposition.

I hope still others of the "fraternity" will be willing to add a cabinet-sized picture of themselves to a supplementary list, to gratify their friends.

W. J. BEAL.

Agricultural College P. O., Mich., May 3.

#### CALENDAR OF SOCIETIES.

**New Mexico Society for the Advancement of Science, Las Cruces, N.M.**

April 6.—F. C. Barker, The English Form of Government; C. H. Tyler Townsend, Life Zones of the Organ Mountains in Southern New Mexico.

**Anthropological Society, Washington.**

May 2.—Henry Gannett, Estimates of Wealth; Wm. T. Harris, The Great Benefit to the Public of the Estimates of Wealth; Anita Newcomb McGee, Transmission of Congenital Deformity; J. D. McGuire, The Evolution of Stone Working.

May 9.—J. N. B. Hewitt, Common Errors in Regard to Indian Language; H. E. Warner, Primitive Belief in a Future State: a Comparative Study; F. A. Seely, The Pivot Point in Modern History; Andrew Palaeologue at Barcelona; Thomas Wilson, Fourth Centenary of the Discovery of America, at Madrid, 1892.

**Geological Society, Washington.**

May 10.—Walter H. Weed, The Post-Laramie Beds of Montana; J. S. Diller, The Tertiary Revolution in the Topography of the Pacific Slope.

**Philosophical Society, Washington.**

May 18.—E. D. Preston, Remarks on the Method of Reducing the Waikiki Observations for Changes of Latitude—Results; F. H. Cushing, Ancient Pueblo Arches; Cleve-

land Abbe, The Formation of Rain; G. K. Gilbert, The Average Temperature of the Earth.

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#### BOOK-REVIEWS.

*Coal-Pits and Pitmen: A Short History of the Coal Trade and the Legislation Affecting It.* By R. NELSON BOYD. London, Whittaker & Co., 1892. 256 p. 12°.

IN this volume, which is an enlarged edition of a paper published under the title of "Coal-Mine Inspection: Its History and Results," the author has gathered a great number of facts relative to the subject. In one chapter he gives an account of the condition of the colliery population during the last century, which is not a pleasing one. The harsh methods of treatment led to many strikes and great destruction of property. The men were at first practically slaves, but an act of Parliament passed in 1775 and another in 1799 did away with the system of bondage, although with little benefit to the men at first. Subsequent acts have mitigated the rigors of their condition and protected them from the rapacity of mine owners and overseers.

The history of the coal trade is treated of in considerable detail, and mention is made of early explosions and means of ascertaining the presence of fire-damp. The early machinery, of a very primitive character compared with modern appliances, is also described. The investigations of one of the various Parliamentary committees show the condition of the colliery operatives in 1833. In referring to this subject, Mr. Boyd states that, "The children were frequently beaten by the men for whom they worked; so much so, that 'they seldom slept with a whole skin.' Besides this, their backs were cut with knocking against the roof and sides of the roadway, and their feet and legs covered with sores and gatherings, owing to the water. The children, boys and girls, earned their wages by drawing the coals in tubs along the galleries by means of a belt and a chain passing between the legs. Many girls were thus employed, and after a time became crooked and deformed. From the nature of the work they soon became as rough and uncouth as the men and boys, fighting and swearing like them."

Considerable attention is given to colliery explosions, and the

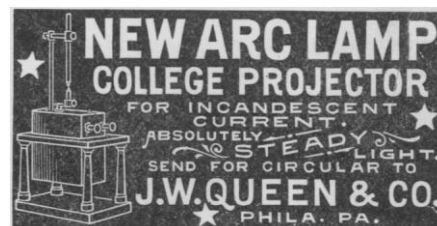
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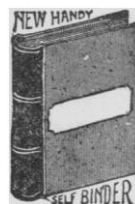
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